

FCC Radio Test Report

FCC ID : 2ABXLT1601S
Equipment : Wireless Transceiver
Brand Name : Tile
Model Name : T1601S
Applicant : Tile, Inc.
1900 S NORFOLK ST. SUITE 310 SAN MATEO CA 94403
Manufacturer : Tile, Inc.
1900 S NORFOLK ST. SUITE 310 SAN MATEO CA 94403
Standard : 47 CFR FCC Part 15.247

The product was received on Aug. 03, 2021, and testing was started from Aug. 09, 2021 and completed on Aug. 10, 2021. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Hsinhua Laboratory, the test report shall not be reproduced except in full.



Approved by: Allen Lin

SPORTON INTERNATIONAL INC. Hsinhua Laboratory

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



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History of this test report

TEL : 886-3-3273456
FAX : 886-3-3270973
Report Template No.: HE1-C10 Ver.4.2
FCC ID: 2ABXLT1601S

Summary of Test Result

Report Clause	Ref.Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
-	15.207	AC Power-line Conducted Emissions	Not Required	Only employ battery power.
3.1	15.247(a)	DTS Bandwidth	PASS	-
3.2	15.247(b)	Maximum Conducted Output Power	PASS	-
3.3	15.247(e)	Power Spectral Density	PASS	-
3.4	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.5	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and explanations:

None

Reviewed by: Sam Tsai

Report Producer: Jenny Yang

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number
2400-2483.5	LE	2402-2480	0-39 [40]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	BT-LE(1Mbps)	1.0	1TX

Note:

- ♦ Bluetooth LE uses a GFSK (1Mbps) modulation.
- ♦ BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Tile Inc.	Slim01_STC	PCB	N/A	1.33

Note 1: The EUT has one antenna.

For BT function:

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Ant. 1 can be used as transmitting/receiving

1.1.3 EUT Information

Operational Condition			
EUT Power Type	From Battery		
EUT Function	☐ Point-to-multipoint	☒ Point-to-point	
Type of EUT			
☒	Stand-alone		
☐	Combined (EUT where the radio part is fully integrated within another device)		
	Combined Equipment - Brand Name / Model No.:	...	
☐	Plug-in radio (EUT intended for a variety of host systems)		
	Host System - Brand Name / Model No.:	...	
☐	Other:		

1.1.4 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	0.314	5.03	392.5u	3k

Note. If DC < 0.98, the DCF was added while measuring Output power and PSD.

1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2013

The following reference test guidance is not within the scope of accreditation of TAF:

- ♦ KDB 558074 D01 v05r02
- ♦ KDB 414788 D01 v01r01

1.3 Testing Location Information

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
☒ Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)			
	TEL: 886-3-327-3456		FAX: 886-3-327-0973	
Test site Designation No. TW3785 with FCC.				
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH06-HY	Howard Lee	22.4~23.6°C / 55~62%	10/Aug/2021
☒ Wen 33rd.St. (TAF: 3785)	ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)			
	TEL: 886-3-318-0787		FAX: 886-3-318-0287	
Test site Designation No. TW0008 with FCC.				
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
Radiated	03CH09-HY	Ryan Hsiao	22.9~23.5°C / 45~62%	09/Aug/2021

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	0.9 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.0 dB	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Test Software Version	N/A
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Note: The EUT transmits RF signal continuously by itself

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	default
2440MHz	default
2480MHz	default

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains

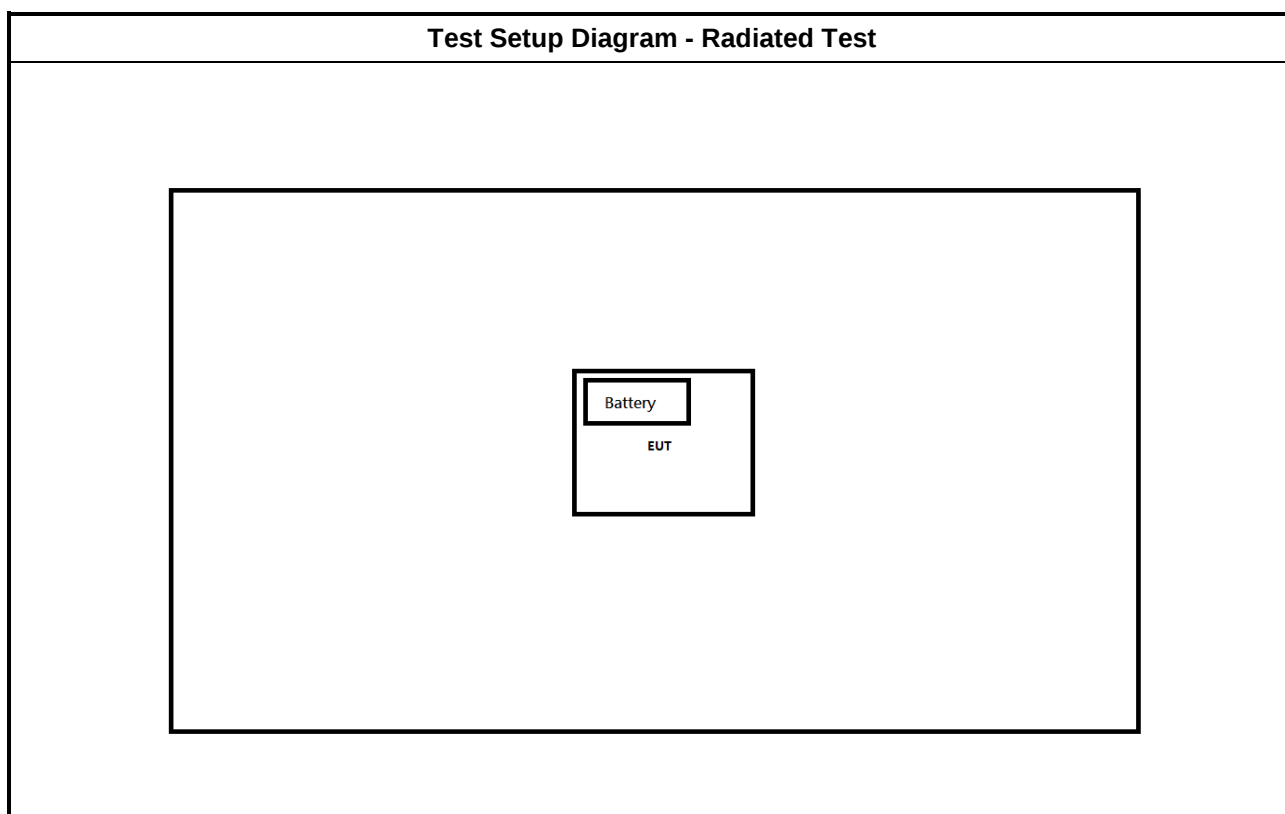
The Worst Case Mode for Following Conformance Tests			
Tests Item	Emissions in Restricted Frequency Bands		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
Operating Mode < 1GHz	CTX		
1	Battery mode		
Operating Mode > 1GHz	CTX		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			
Worst Planes of EUT			V

2.3 Accessories

Accessories				
Battery	Brand Name	ABLE NEW ENERGY Co., Ltd & EVE Energy Co. Ltd.	Model Name	CP114951
	Power Rating	3.1 Vdc, 380 mAh	Type	Thin cell Lithium Manganese Dioxide batteries

Reminder: Regarding to more detail and other information, please refer to user manual.

2.4 Test Setup Diagram



3 Transmitter Test Result

3.1 DTS Bandwidth

3.1.1 6dB Bandwidth Limit

6dB Bandwidth Limit	
Systems using digital modulation techniques:	
▪	6 dB bandwidth $\geq$ 500 kHz.

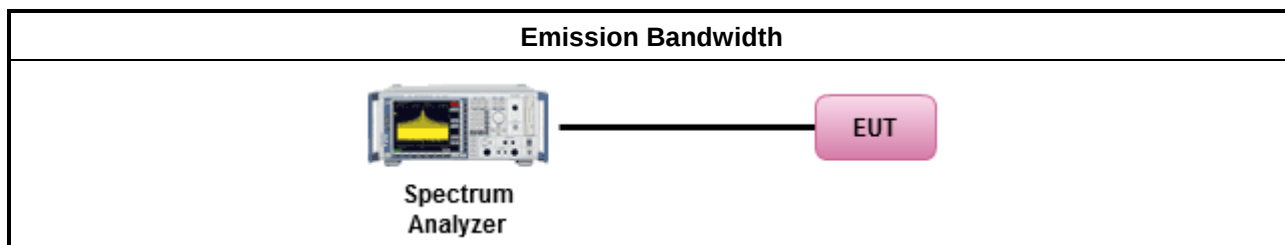
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method	
▪ For the emission bandwidth shall be measured using one of the options below:	
☒	Refer as KDB 558074, clause 8.2 (11.8 of ANSI C63.10) DTS bandwidth measurement.
☐	Refer as RSS-Gen, clause 6.7 for occupied bandwidth testing.
☐	Refer as ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.

3.1.4 Test Setup



3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A

3.2 Maximum Conducted Output Power

3.2.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	Smart antenna system (SAS):
	- Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	- Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	- Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dB dBm
e.i.r.p. Power Limit:	
	2400-2483.5 MHz Band
	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
	Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
	Smart antenna system (SAS)
	- Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	- Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	- Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.	

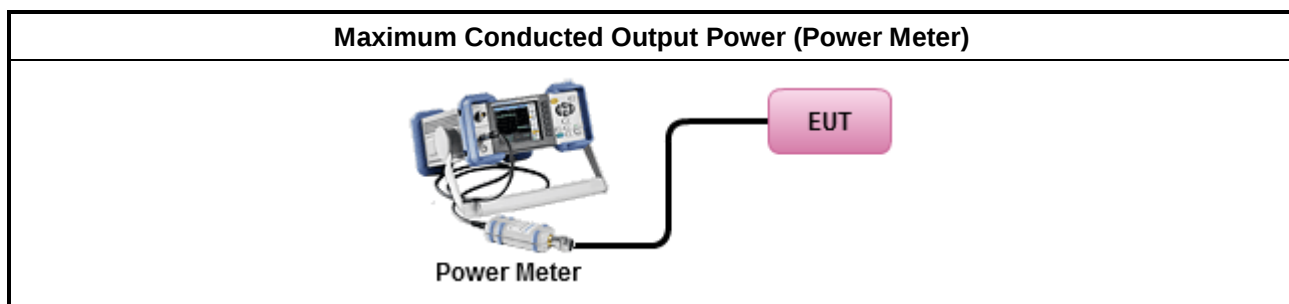
3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
Maximum Peak Conducted Output Power	
☐	Refer as KDB 558074, clause 8.3.1.1 (11.9.1.1 of ANSI C63.10) RBW ≥ EBW method.
☐	Refer as KDB 558074, clause 8.3.1.2 (11.9.1.2 of ANSI C63.10) integrated band power method.
☐	Refer as KDB 558074, clause 8.3.1.3 (11.9.1.3 of ANSI C63.10) peak power meter.
Maximum Average Conducted Output Power	
☐	Refer as KDB 558074, clause 8.3.2.2 (11.9.2.2 of ANSI C63.10) using a spectrum analyzer.
☒	Refer as KDB 558074, clause 8.3.2.3 (11.9.2.3 of ANSI C63.10) using a power meter.
For conducted measurement.	
If the EUT supports multiple transmit chains using options given below: Refer as KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.	
If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$	

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B

3.3 Power Spectral Density

3.3.1 Power Spectral Density Limit

Power Spectral Density Limit	
▪	Power Spectral Density (PSD) ≤ 8 dBm/3kHz

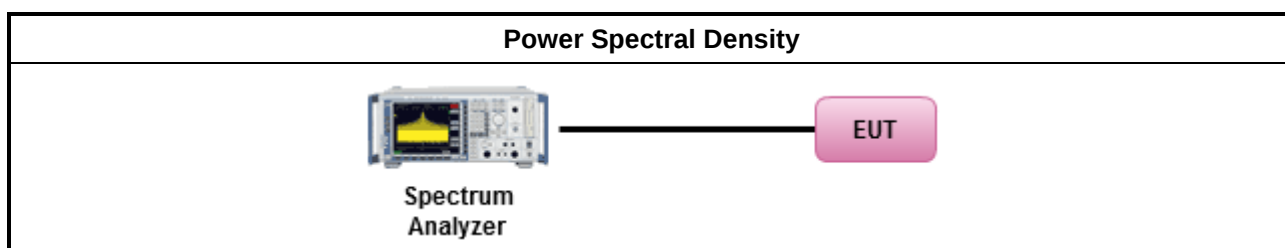
3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
▪	Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).
☒	Refer as KDB 558074, clause 8.4 (11.10 of ANSI C63.10) Max. PSD.
▪	For conducted measurement.
▪	If The EUT supports multiple transmit chains using options given below:
▪	Measure and sum the spectra across the outputs. Refer as KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Refer as Appendix C

3.4 Emissions in Non-restricted Frequency Bands

3.4.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30
Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak level. Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average level.	

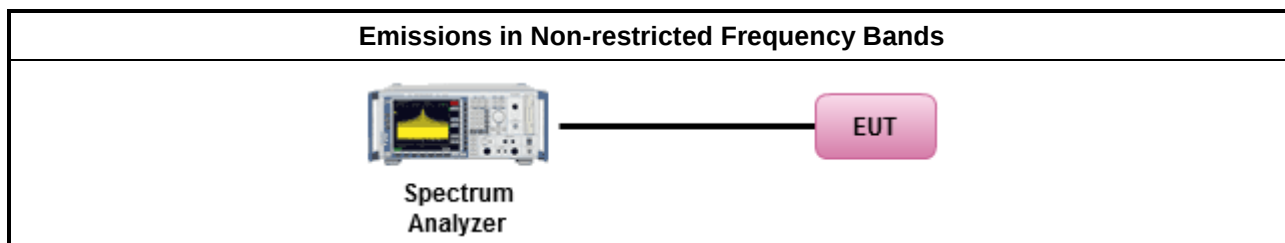
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method
Refer as KDB 558074, clause 8.5 (11.11 of ANSI C63.10) for non-restricted frequency bands.

3.4.4 Test Setup



3.4.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix D

3.5 Emissions in Restricted Frequency Bands

3.5.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB / decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

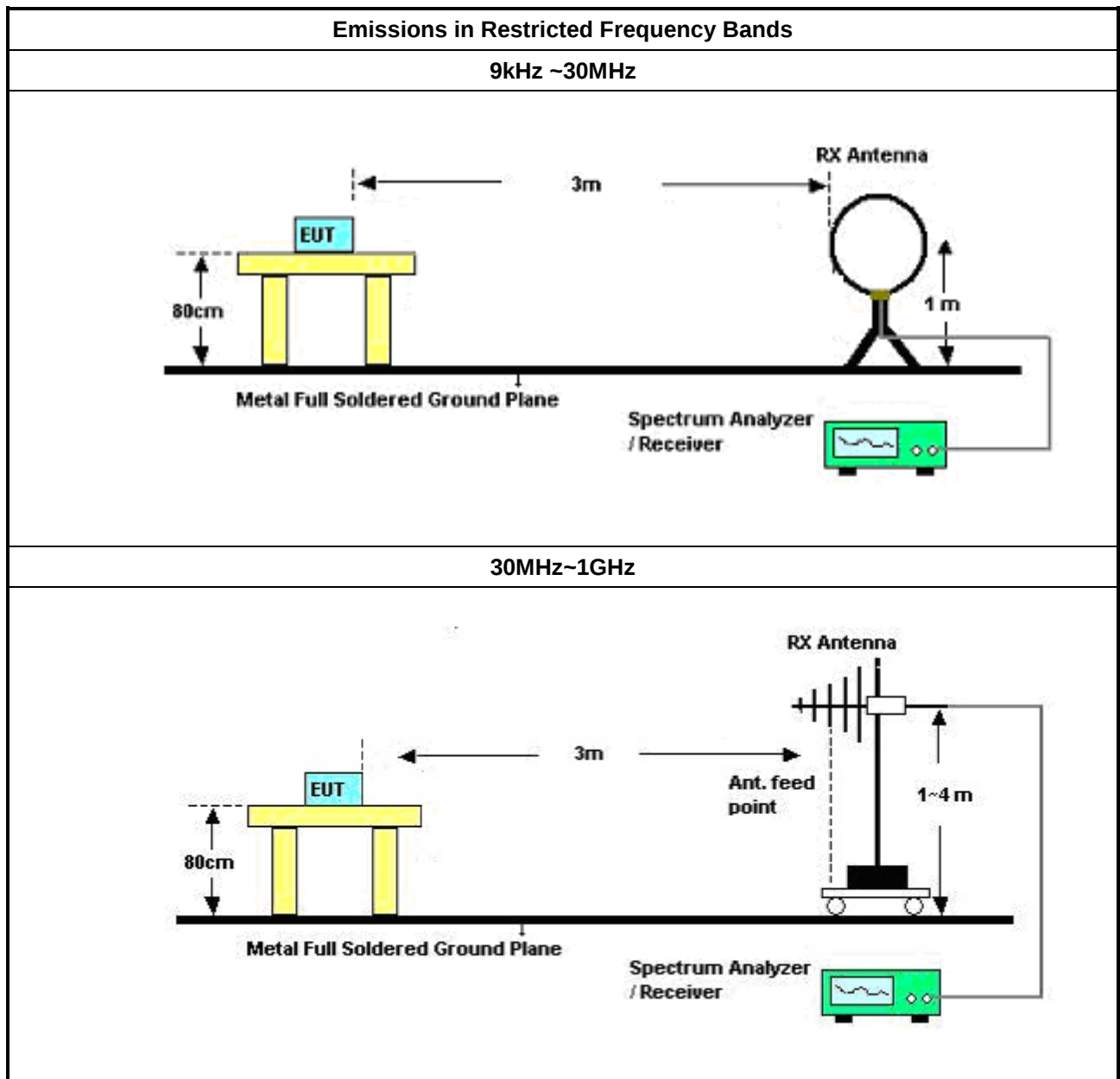
Test Method	
The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].	
Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.	
For the transmitter unwanted emissions shall be measured using following options below:	
	Refer as KDB 558074, clause 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.
For the transmitter band-edge emissions shall be measured using following options below:	
	Refer as KDB 558074 clause 8.7.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.
	Refer as KDB 558074, clause 8.7.2 (6.10.6 of ANSI C63.10) for marker-delta method for band-edge measurements.
	Refer as KDB 558074, clause 8.7.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels.
Use the following spectrum analyzer settings:	
	Set RBW=100 kHz for $f < 1$ GHz; VBW=3 * RBW; Sweep = auto; Detector function = peak; Trace = max hold.
	Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement. For average measurement, refer as 1.1.4.
KDB 414788 Open-Field Test Sites and Chamber Correlation Justification.	
	Based on FCC 15.31(f)(2): measurements may be performed at a distance closer than that specified in regulations; however, an attempt should be made to avoid making measurements in the near field.
	Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

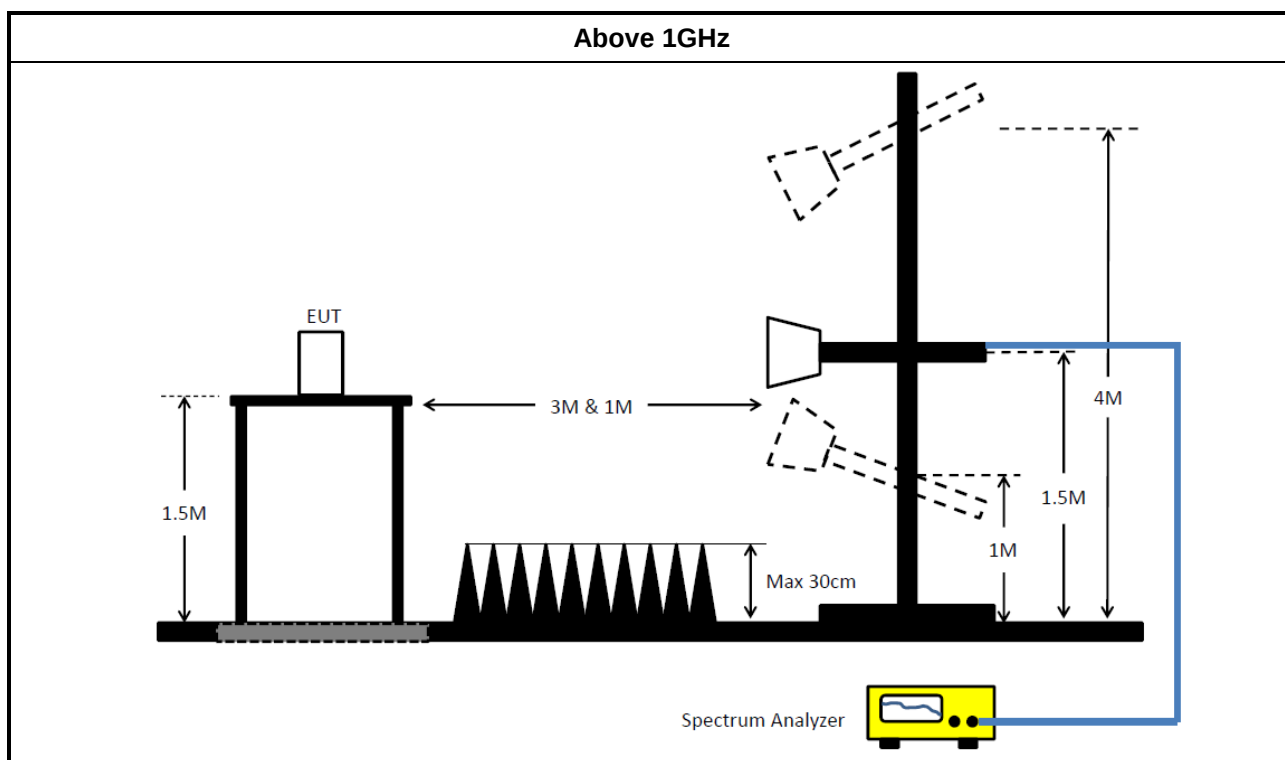
3.5.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamplifier Factor)

3.5.5 Test Setup





3.5.6 Test Result of Emissions in Restricted Frequency Bands (Below 30MHz)

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

3.5.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix E

4 Test Equipment and Calibration Data

Instrument for Conducted Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV 40	101029	10Hz~40GHz	19/Oct/2020	18/Oct/2021
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	20/Oct/2020	19/Oct/2021
Pulse Sensor	Anritsu	MA2411B	1027452	300MHz~40GHz	25/Mar/2021	24/Mar/2022
Power Meter	Anritsu	ML2495A	1124009	300MHz~40GHz	25/Mar/2021	24/Mar/2022

Instrument for Radiated Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz~1GHz 3m	26/Mar/2021	25/Mar/2022
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	1GHz~18GHz 3m	18/Mar/2021	17/Mar/2022
Spectrum Analyzer	R&S	FSP30	100793	9 kHz ~ 30GHz	30/Jun/2021	29/Jun/2022
Amplifier	EMC	EMC9135	980232	9kHz~1GHz	12/Apr/2021	11/Apr/2022
Microwave Preamplifier	Agilent	8449B	3008A02096	1GHz~26.5GHz	23/Jul/2021	22/Jul/2022
Bilog Antenna & 5dB Attenuator	TESEQ & MTJ	CBL6111D&MT J6102-05	35418 & 3	30MHz~1GHz	06/Sep/2020	05/Sep/2021
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA9120 D 1534	1GHz~18GHz	18/May/2021	17/May/2022
RF Cable-low	Jye Bao	RG142	CB031+324530/4	9kHz~30MHz	03/Sep/2020	02/Sep/2021
RF Cable-low	Jye Bao	RG142	CB031+324530/4	30MHz~1GHz	09/Feb/2021	08/Feb/2022
RF CABLE 5m+3m+1m	HUBER+SUHNER	SUCOFLEX104	SN MY25918/4+ SN MY39478/4 + SN 324530/4	1GHz~40GHz	15/Aug/2020	14/Aug/2021
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	18GHz~40GHz	11/Mar/2021	10/Mar/2022
Microwave Premplifier	EMC INSTRUMENTS	EM18G40G	060604	18GHz ~ 40GHz	09/Mar/2021	08/Mar/2022
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	16/Mar/2021	15/Mar/2022
EMI Test Receiver	R&S	ESR3	102052	9kHz~3.6GHz	19/Apr/2021	18/Apr/2022



Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	672.5k	1.022M	1M02F1D	665k	1.017M

Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth

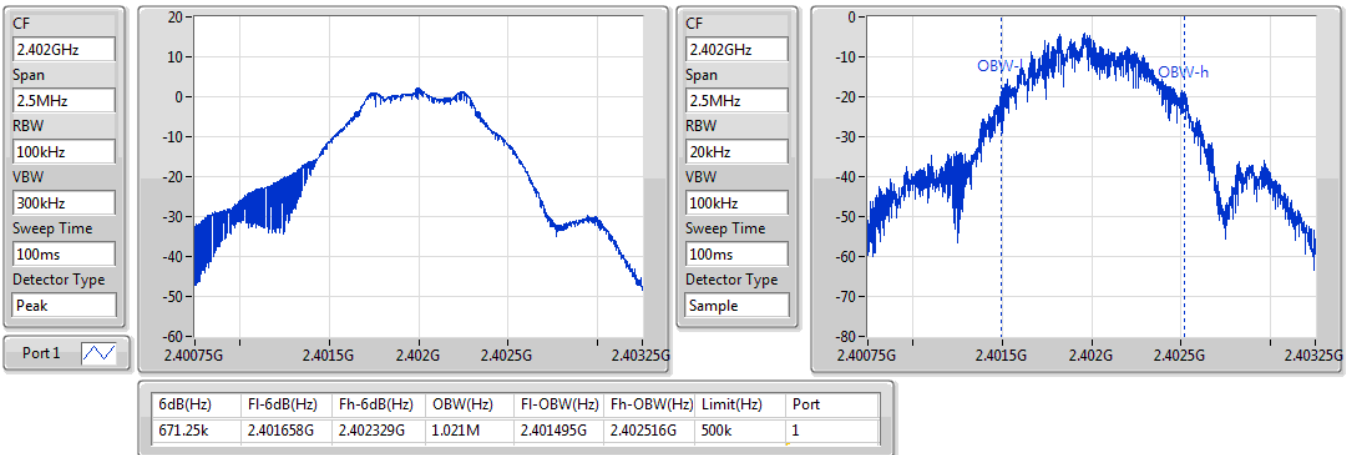
**Result**

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	671.25k	1.021M
2440MHz	Pass	500k	665k	1.017M
2480MHz	Pass	500k	672.5k	1.022M

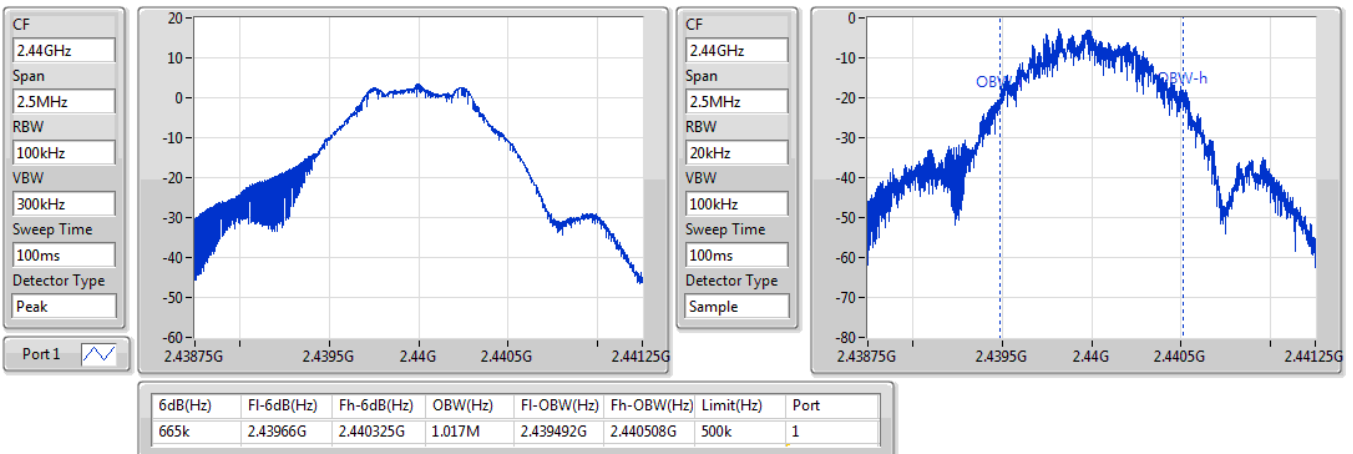
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

BT-LE(1Mbps)
2402MHz
EBW-DTS

10/08/2021

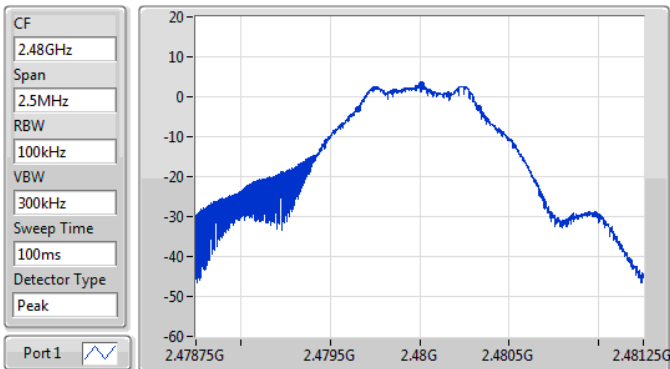

BT-LE(1Mbps)
2440MHz
EBW-DTS

10/08/2021



BT-LE(1Mbps)

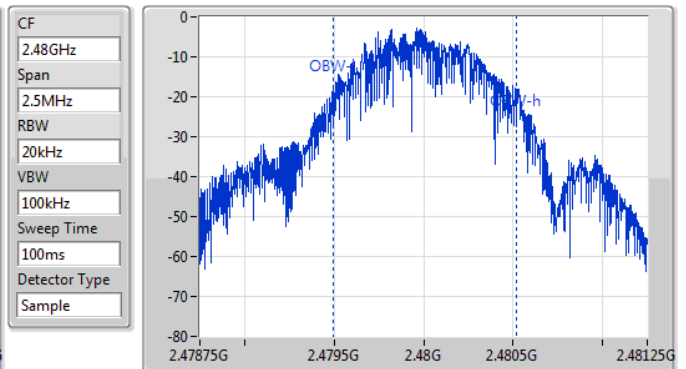
2480MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
672.5k	2.479656G	2.480329G	1.022M	2.479495G	2.480517G	500k	1

EBW-DTS

10/08/2021





Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	3.97	0.00249



Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	1.33	3.94	30.00
2440MHz	Pass	1.33	3.97	30.00
2480MHz	Pass	1.33	3.96	30.00

DG = Directional Gain; Port X = Port X output power



Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-11.39

RBW = 3kHz;



Result

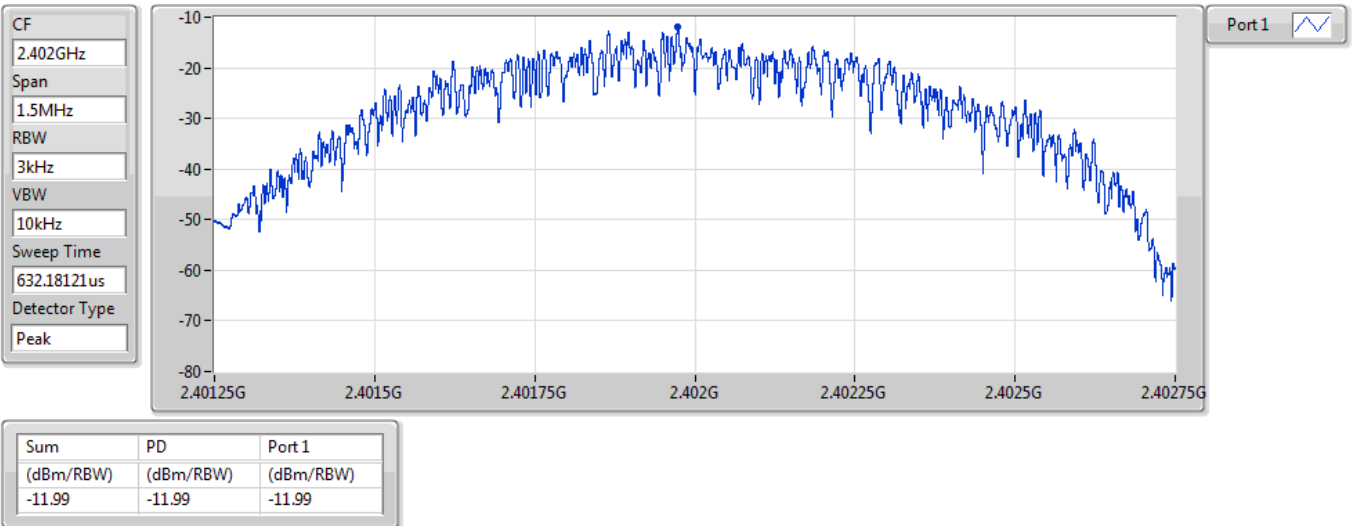
Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	1.33	-11.99	8.00
2440MHz	Pass	1.33	-11.82	8.00
2480MHz	Pass	1.33	-11.39	8.00

DG = Directional Gain; RBW = 3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

BT-LE(1Mbps)

2402MHz

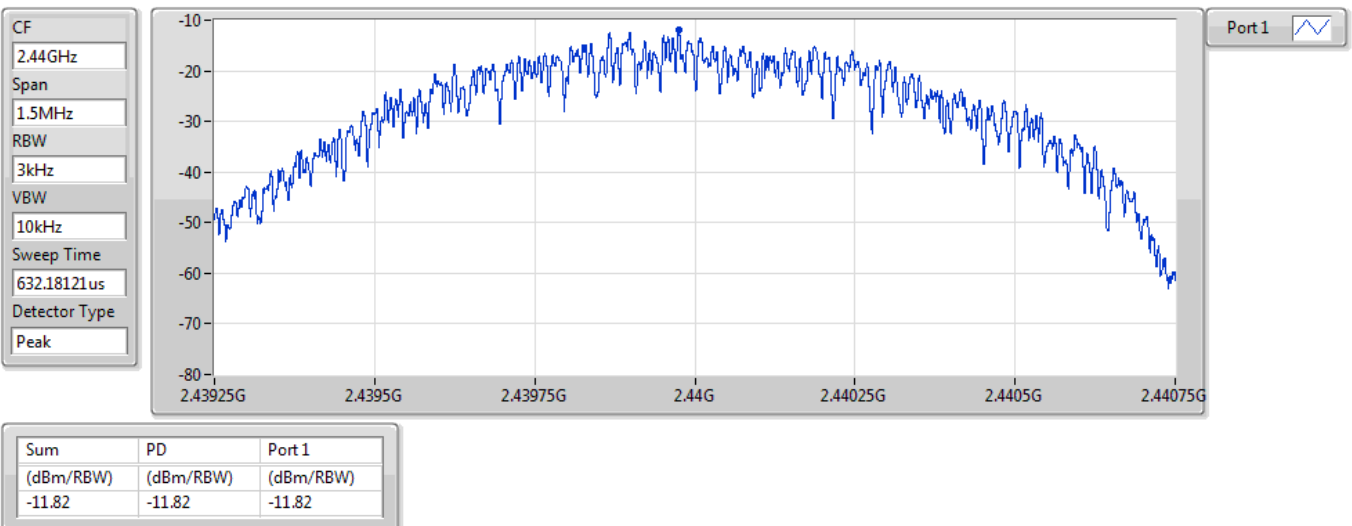
10/08/2021



BT-LE(1Mbps)

2440MHz

10/08/2021

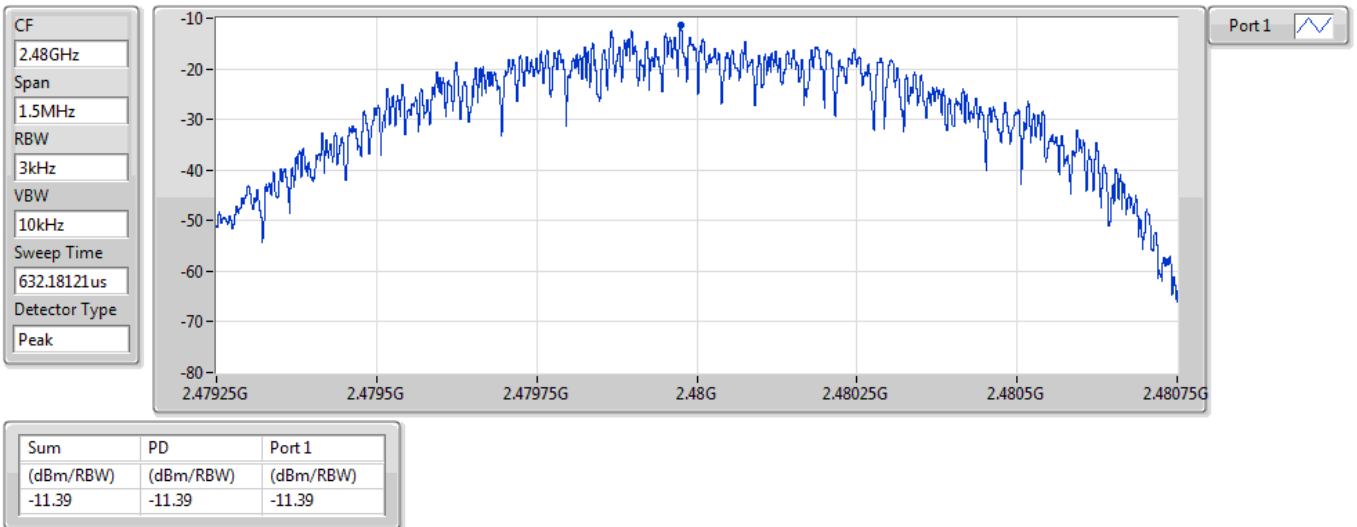


BT-LE(1Mbps)

2480MHz

PSD

10/08/2021





Summary

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.47999G	2.78	-27.22	50.27M	-63.32	2.39995G	-46.25	2.4G	-45.93	2.48749G	-61.96	7.20527G	-51.76	1



Result

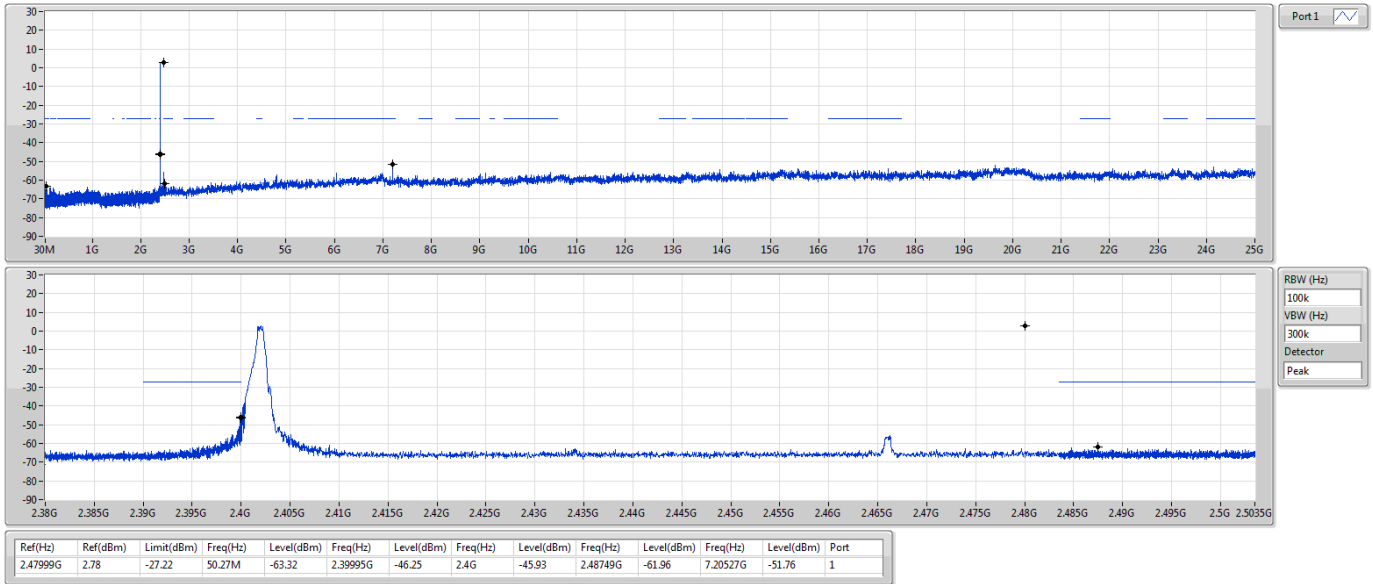
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.47999G	2.78	-27.22	50.27M	-63.32	2.39995G	-46.25	2.4G	-45.93	2.48749G	-61.96	7.20527G	-51.76	1
2440MHz	Pass	2.47999G	2.78	-27.22	63.78M	-61.38	2.39729G	-63.90	2.4G	-65.43	2.49971G	-62.45	24.46852G	-53.64	1
2480MHz	Pass	2.47999G	2.78	-27.22	47.04M	-63.06	2.39234G	-64.15	2.4835G	-57.19	2.4835G	-56.69	15.21683G	-53.55	1

BT-LE(1Mbps)

2402MHz

CSEndB-DTS

10/08/2021

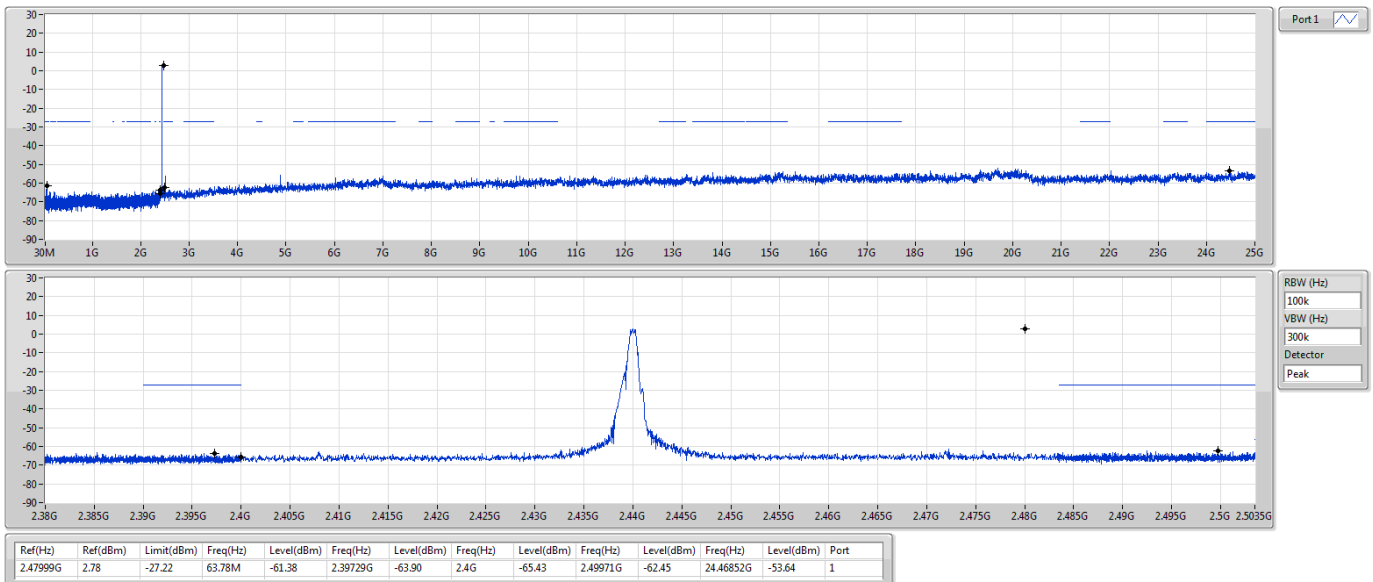


BT-LE(1Mbps)

2440MHz

CSEndB-DTS

10/08/2021

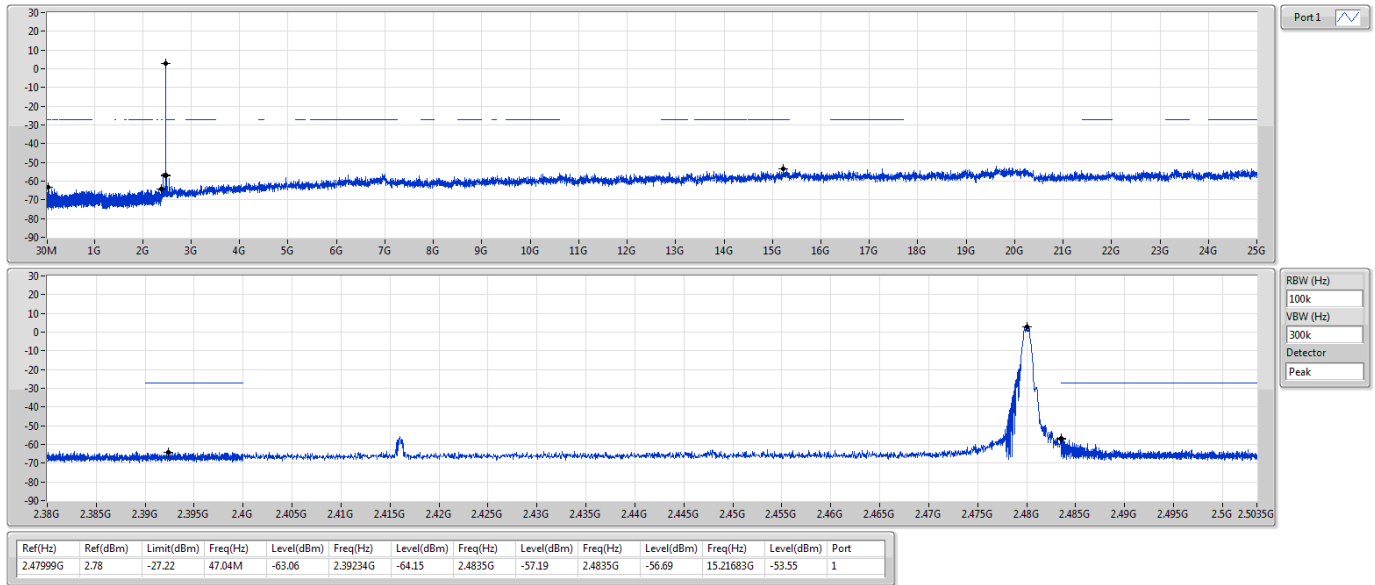


BT-LE(1Mbps)

CSEndB-DTS

2480MHz

10/08/2021





Summary

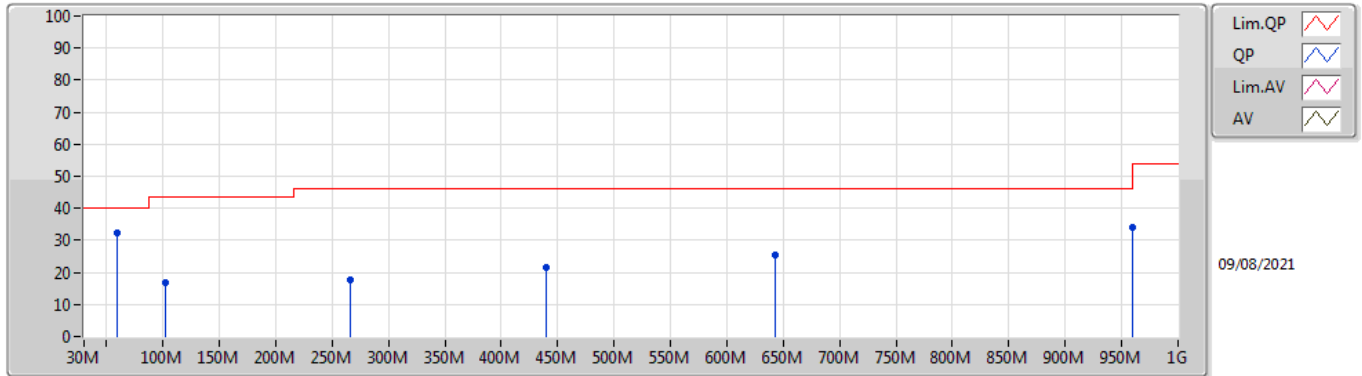
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	PK	59.1M	32.21	40.00	-7.79	3	Vertical	360	1.00	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	59.1M	32.21	40.00	-7.79	3	Vertical	360	1.00	-
2440MHz	Pass	PK	101.78M	16.78	43.50	-26.72	3	Vertical	360	1.00	-
2440MHz	Pass	PK	266.68M	17.66	46.00	-28.34	3	Vertical	360	1.00	-
2440MHz	Pass	PK	439.34M	21.54	46.00	-24.46	3	Vertical	360	1.00	-
2440MHz	Pass	PK	643.04M	25.57	46.00	-20.43	3	Vertical	360	1.00	-
2440MHz	Pass	PK	960M	33.90	46.00	-12.10	3	Vertical	360	1.00	-
2440MHz	Pass	PK	30M	19.99	40.00	-20.01	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	127M	15.12	43.50	-28.38	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	258.92M	17.92	46.00	-28.08	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	561.56M	24.19	46.00	-21.81	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	895.24M	29.86	46.00	-16.14	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	959.26M	32.08	46.00	-13.92	3	Horizontal	0	1.00	-

BT-LE(1Mbps)

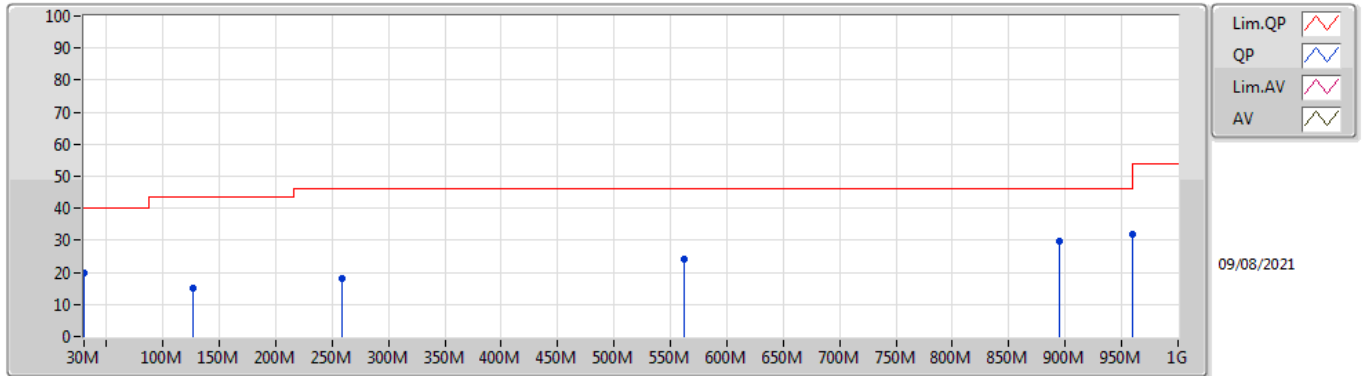
2440MHz_Battery



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	59.1M	32.21	40.00	-7.79	-25.40	3	Vertical	360	1.00	-	57.61	10.85	0.82	37.07
PK	101.78M	16.78	43.50	-26.72	-20.34	3	Vertical	360	1.00	-	37.12	15.31	0.98	36.63
PK	266.68M	17.66	46.00	-28.34	-16.12	3	Vertical	360	1.00	-	33.78	18.73	1.56	36.41
PK	439.34M	21.54	46.00	-24.46	-12.30	3	Vertical	360	1.00	-	33.84	22.25	2.06	36.61
PK	643.04M	25.57	46.00	-20.43	-9.06	3	Vertical	360	1.00	-	34.63	25.57	2.60	37.23
PK	960M	33.90	46.00	-12.10	-4.11	3	Vertical	360	1.00	-	38.01	30.25	3.11	37.47

BT-LE(1Mbps)

2440MHz_Battery



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	30M	19.99	40.00	-20.01	-13.08	3	Horizontal	0	1.00	-	33.07	23.51	0.56	37.15
PK	127M	15.12	43.50	-28.38	-18.56	3	Horizontal	0	1.00	-	33.68	16.92	1.11	36.59
PK	258.92M	17.92	46.00	-28.08	-15.86	3	Horizontal	0	1.00	-	33.78	19.01	1.53	36.40
PK	561.56M	24.19	46.00	-21.81	-9.30	3	Horizontal	0	1.00	-	33.49	25.39	2.40	37.09
PK	895.24M	29.86	46.00	-16.14	-6.42	3	Horizontal	0	1.00	-	36.28	28.14	2.99	37.55
PK	959.26M	32.08	46.00	-13.92	-4.13	3	Horizontal	0	1.00	-	36.21	30.24	3.11	37.48



Summary

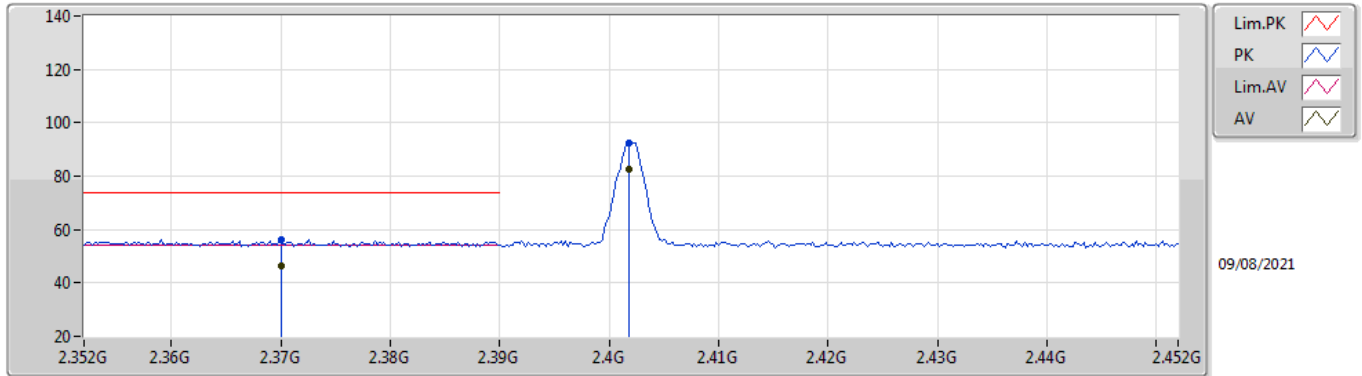
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LTE(1Mbps)	Pass	AV	7.43928G	52.80	54.00	-1.20	3	Horizontal	233	1.00	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.37G	46.17	54.00	-7.83	3	Vertical	109	2.88	-
2402MHz	Pass	AV	2.4018G	82.55	Inf	-Inf	3	Vertical	109	2.88	-
2402MHz	Pass	PK	2.37G	56.20	74.00	-17.80	3	Vertical	109	2.88	-
2402MHz	Pass	PK	2.4018G	92.58	Inf	-Inf	3	Vertical	109	2.88	-
2402MHz	Pass	AV	2.356G	46.23	54.00	-7.77	3	Horizontal	56	1.32	-
2402MHz	Pass	AV	2.4018G	90.23	Inf	-Inf	3	Horizontal	56	1.32	-
2402MHz	Pass	PK	2.356G	56.26	74.00	-17.74	3	Horizontal	56	1.32	-
2402MHz	Pass	PK	2.4018G	100.26	Inf	-Inf	3	Horizontal	56	1.32	-
2402MHz	Pass	AV	4.80444G	39.96	54.00	-14.04	3	Vertical	96	2.96	-
2402MHz	Pass	PK	4.80444G	49.99	74.00	-24.01	3	Vertical	96	2.96	-
2402MHz	Pass	AV	4.8033G	47.17	54.00	-6.83	3	Horizontal	125	1.02	-
2402MHz	Pass	PK	4.8033G	57.20	74.00	-16.80	3	Horizontal	125	1.02	-
2440MHz	Pass	AV	2.382G	46.26	54.00	-7.74	3	Vertical	100	3.00	-
2440MHz	Pass	AV	2.44G	82.28	Inf	-Inf	3	Vertical	100	3.00	-
2440MHz	Pass	AV	2.4896G	45.46	54.00	-8.54	3	Vertical	100	3.00	-
2440MHz	Pass	PK	2.382G	56.29	74.00	-17.71	3	Vertical	100	3.00	-
2440MHz	Pass	PK	2.44G	92.31	Inf	-Inf	3	Vertical	100	3.00	-
2440MHz	Pass	PK	2.4896G	55.49	74.00	-18.51	3	Vertical	100	3.00	-
2440MHz	Pass	AV	2.3532G	46.65	54.00	-7.35	3	Horizontal	62	1.44	-
2440MHz	Pass	AV	2.44G	89.19	Inf	-Inf	3	Horizontal	62	1.44	-
2440MHz	Pass	AV	2.4964G	45.19	54.00	-8.81	3	Horizontal	62	1.44	-
2440MHz	Pass	PK	2.3532G	56.68	74.00	-17.32	3	Horizontal	62	1.44	-
2440MHz	Pass	PK	2.44G	99.22	Inf	-Inf	3	Horizontal	62	1.44	-
2440MHz	Pass	PK	2.4964G	55.22	74.00	-18.78	3	Horizontal	62	1.44	-
2440MHz	Pass	AV	4.88049G	40.09	54.00	-13.91	3	Vertical	104	3.00	-
2440MHz	Pass	AV	7.31932G	47.18	54.00	-6.82	3	Vertical	122	2.78	-
2440MHz	Pass	PK	4.88049G	50.12	74.00	-23.88	3	Vertical	104	3.00	-
2440MHz	Pass	PK	7.31932G	57.21	74.00	-16.79	3	Vertical	122	2.78	-
2440MHz	Pass	AV	4.87936G	47.61	54.00	-6.39	3	Horizontal	126	1.00	-
2440MHz	Pass	AV	7.32078G	52.79	54.00	-1.21	3	Horizontal	233	1.00	-
2440MHz	Pass	PK	4.87936G	57.64	74.00	-16.36	3	Horizontal	126	1.00	-
2440MHz	Pass	PK	7.32078G	62.82	74.00	-11.18	3	Horizontal	233	1.00	-
2480MHz	Pass	AV	2.4802G	82.70	Inf	-Inf	3	Vertical	91	2.97	-
2480MHz	Pass	AV	2.4872G	45.61	54.00	-8.39	3	Vertical	91	2.97	-
2480MHz	Pass	PK	2.4802G	92.73	Inf	-Inf	3	Vertical	91	2.97	-
2480MHz	Pass	PK	2.4872G	55.64	74.00	-18.36	3	Vertical	91	2.97	-
2480MHz	Pass	AV	2.4798G	89.78	Inf	-Inf	3	Horizontal	60	1.00	-
2480MHz	Pass	AV	2.486G	45.72	54.00	-8.28	3	Horizontal	60	1.00	-
2480MHz	Pass	PK	2.4798G	99.81	Inf	-Inf	3	Horizontal	60	1.00	-
2480MHz	Pass	PK	2.486G	55.75	74.00	-18.25	3	Horizontal	60	1.00	-
2480MHz	Pass	AV	4.96055G	41.09	54.00	-12.91	3	Vertical	99	2.73	-
2480MHz	Pass	AV	7.43921G	45.87	54.00	-8.13	3	Vertical	183	2.90	-
2480MHz	Pass	PK	4.96055G	51.12	74.00	-22.88	3	Vertical	99	2.73	-
2480MHz	Pass	PK	7.43921G	55.90	74.00	-18.10	3	Vertical	183	2.90	-
2480MHz	Pass	AV	4.96053G	48.20	54.00	-5.80	3	Horizontal	126	1.00	-
2480MHz	Pass	AV	7.43928G	52.80	54.00	-1.20	3	Horizontal	233	1.00	-
2480MHz	Pass	PK	4.96053G	58.23	74.00	-15.77	3	Horizontal	126	1.00	-
2480MHz	Pass	PK	7.43928G	62.83	74.00	-11.17	3	Horizontal	233	1.00	-

BT-LE(1Mbps)

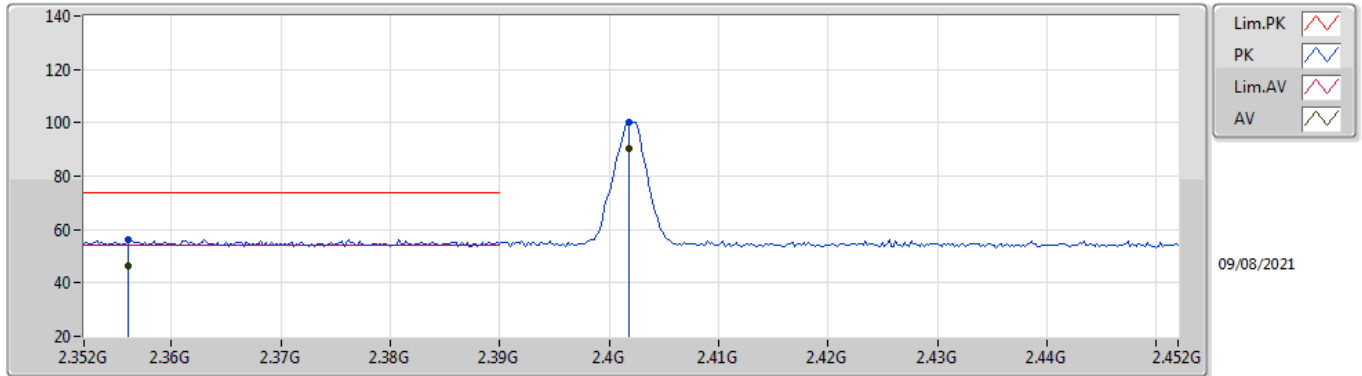
2402MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.37G	46.17	54.00	-7.83	31.57	3	Vertical	109	2.88	-	14.60	27.72	3.85	-
AV	2.4018G	82.55	Inf	-Inf	31.50	3	Vertical	109	2.88	-	51.05	27.60	3.90	-
PK	2.37G	56.20	74.00	-17.80	31.57	3	Vertical	109	2.88	-	24.63	27.72	3.85	-
PK	2.4018G	92.58	Inf	-Inf	31.50	3	Vertical	109	2.88	-	61.08	27.60	3.90	-

BT-LE(1Mbps)

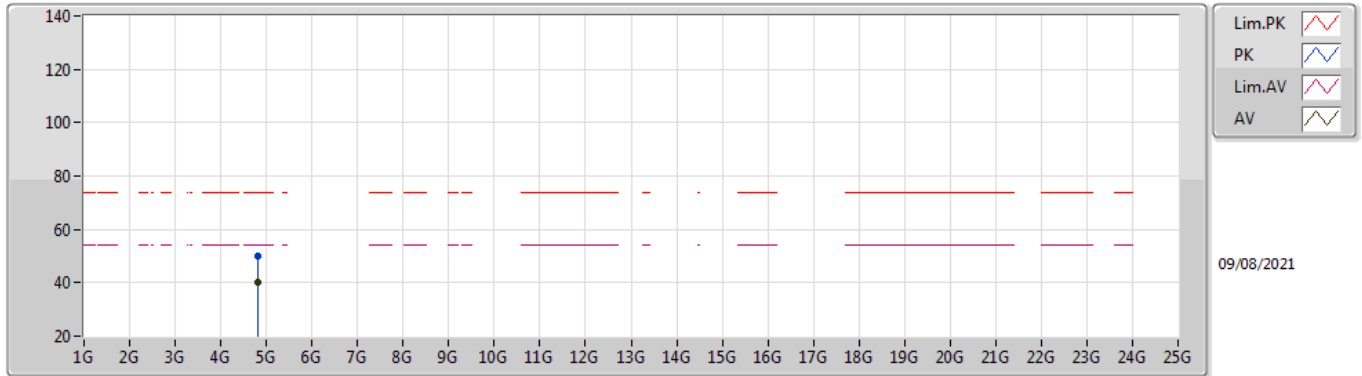
2402MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.356G	46.23	54.00	-7.77	31.61	3	Horizontal	56	1.32	-	14.62	27.78	3.83	-
AV	2.4018G	90.23	Inf	-Inf	31.50	3	Horizontal	56	1.32	-	58.73	27.60	3.90	-
PK	2.356G	56.26	74.00	-17.74	31.61	3	Horizontal	56	1.32	-	24.65	27.78	3.83	-
PK	2.4018G	100.26	Inf	-Inf	31.50	3	Horizontal	56	1.32	-	68.76	27.60	3.90	-

BT-LE(1Mbps)

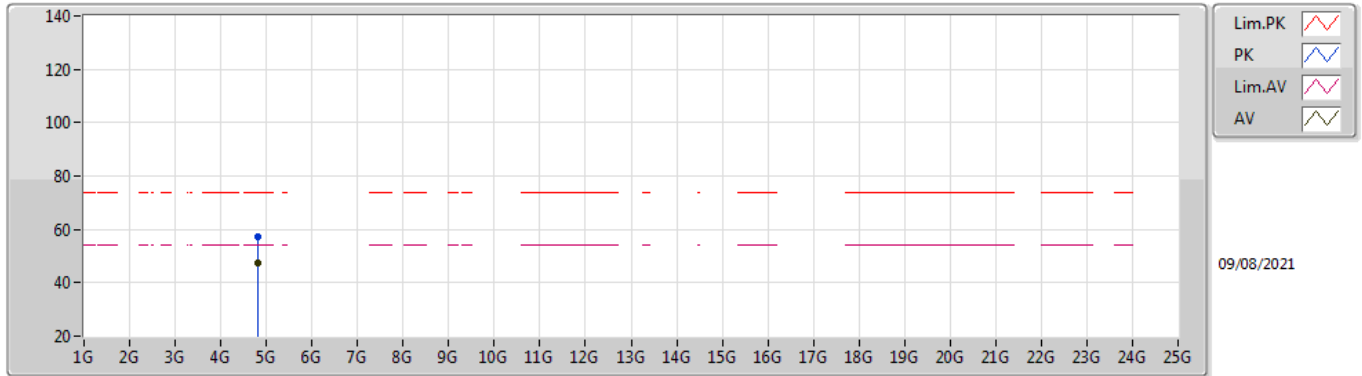
2402MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.80444G	39.96	54.00	-14.04	1.59	3	Vertical	96	2.96	-	38.37	31.10	5.30	34.81
PK	4.80444G	49.99	74.00	-24.01	1.59	3	Vertical	96	2.96	-	48.40	31.10	5.30	34.81

BT-LE(1Mbps)

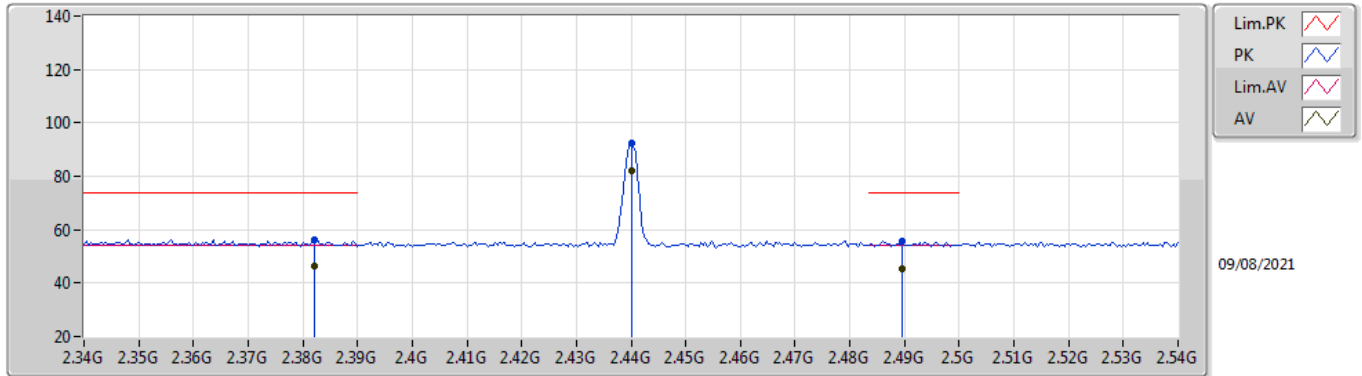
2402MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.8033G	47.17	54.00	-6.83	1.59	3	Horizontal	125	1.02	-	45.58	31.10	5.30	34.81
PK	4.8033G	57.20	74.00	-16.80	1.59	3	Horizontal	125	1.02	-	55.61	31.10	5.30	34.81

BT-LE(1Mbps)

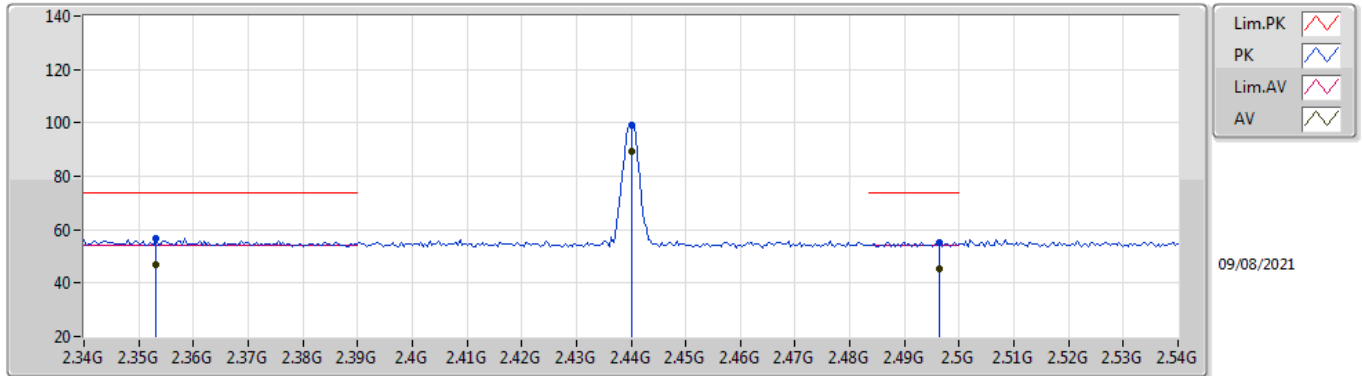
2440MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.382G	46.26	54.00	-7.74	31.54	3	Vertical	100	3.00	-	14.72	27.67	3.87	-
AV	2.44G	82.28	Inf	-Inf	31.48	3	Vertical	100	3.00	-	50.80	27.52	3.96	-
AV	2.4896G	45.46	54.00	-8.54	31.53	3	Vertical	100	3.00	-	13.93	27.50	4.03	-
PK	2.382G	56.29	74.00	-17.71	31.54	3	Vertical	100	3.00	-	24.75	27.67	3.87	-
PK	2.44G	92.31	Inf	-Inf	31.48	3	Vertical	100	3.00	-	60.83	27.52	3.96	-
PK	2.4896G	55.49	74.00	-18.51	31.53	3	Vertical	100	3.00	-	23.96	27.50	4.03	-

BT-LE(1Mbps)

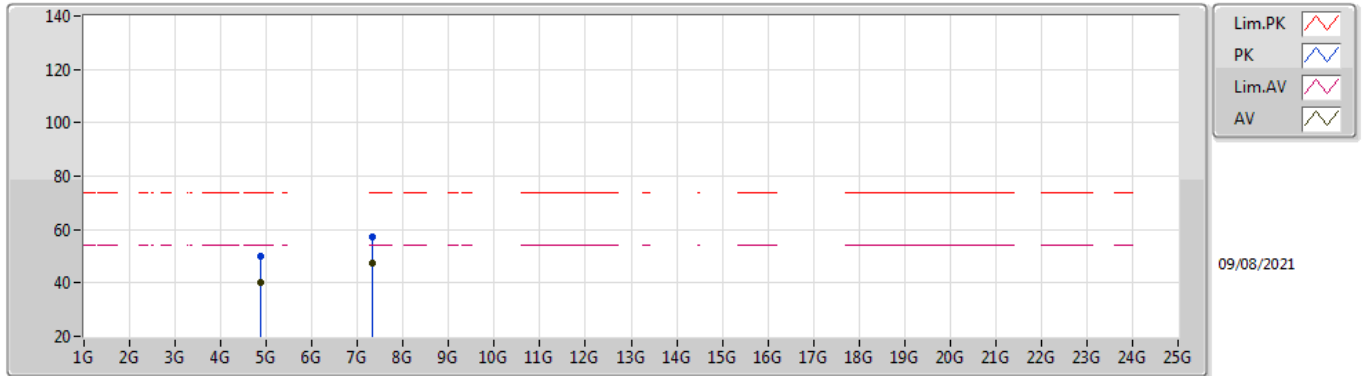
2440MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3532G	46.65	54.00	-7.35	31.62	3	Horizontal	62	1.44	-	15.03	27.79	3.83	-
AV	2.44G	89.19	Inf	-Inf	31.48	3	Horizontal	62	1.44	-	57.71	27.52	3.96	-
AV	2.4964G	45.19	54.00	-8.81	31.54	3	Horizontal	62	1.44	-	13.65	27.50	4.04	-
PK	2.3532G	56.68	74.00	-17.32	31.62	3	Horizontal	62	1.44	-	25.06	27.79	3.83	-
PK	2.44G	99.22	Inf	-Inf	31.48	3	Horizontal	62	1.44	-	67.74	27.52	3.96	-
PK	2.4964G	55.22	74.00	-18.78	31.54	3	Horizontal	62	1.44	-	23.68	27.50	4.04	-

BT-LE(1Mbps)

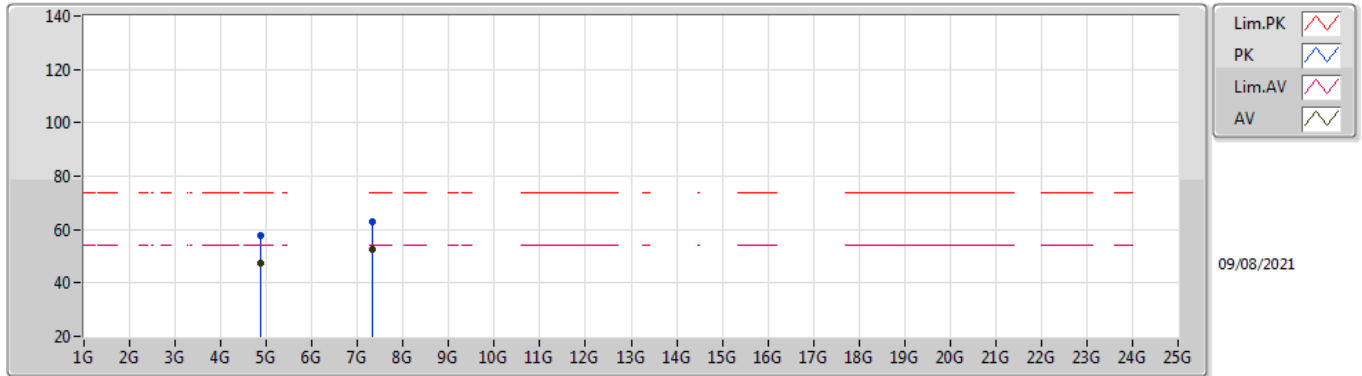
2440MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.88049G	40.09	54.00	-13.91	1.65	3	Vertical	104	3.00	-	38.44	31.10	5.34	34.79
AV	7.31932G	47.18	54.00	-6.82	8.34	3	Vertical	122	2.78	-	38.84	36.36	6.80	34.82
PK	4.88049G	50.12	74.00	-23.88	1.65	3	Vertical	104	3.00	-	48.47	31.10	5.34	34.79
PK	7.31932G	57.21	74.00	-16.79	8.34	3	Vertical	122	2.78	-	48.87	36.36	6.80	34.82

BT-LE(1Mbps)

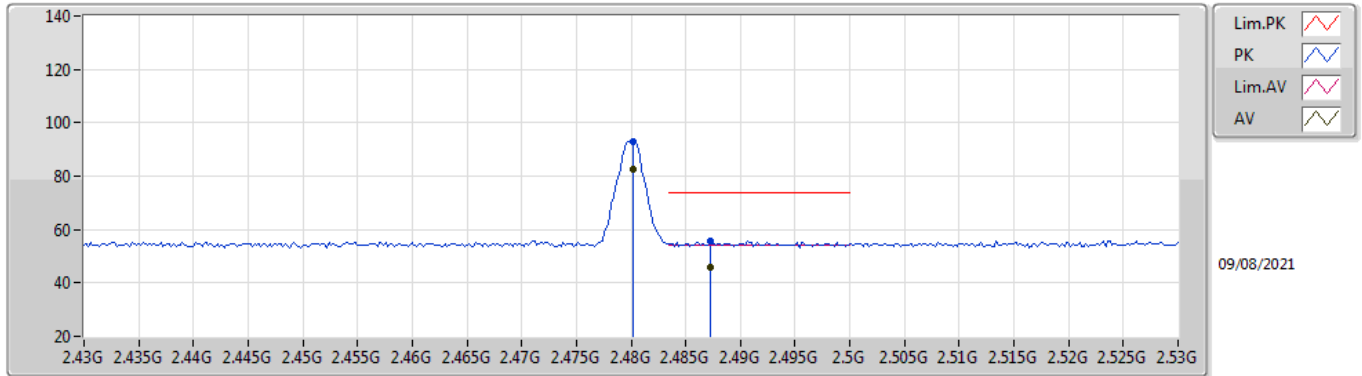
2440MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.87936G	47.61	54.00	-6.39	1.65	3	Horizontal	126	1.00	-	45.96	31.10	5.34	34.79
AV	7.32078G	52.79	54.00	-1.21	8.34	3	Horizontal	233	1.00	-	44.45	36.36	6.80	34.82
PK	4.87936G	57.64	74.00	-16.36	1.65	3	Horizontal	126	1.00	-	55.99	31.10	5.34	34.79
PK	7.32078G	62.82	74.00	-11.18	8.34	3	Horizontal	233	1.00	-	54.48	36.36	6.80	34.82

BT-LE(1Mbps)

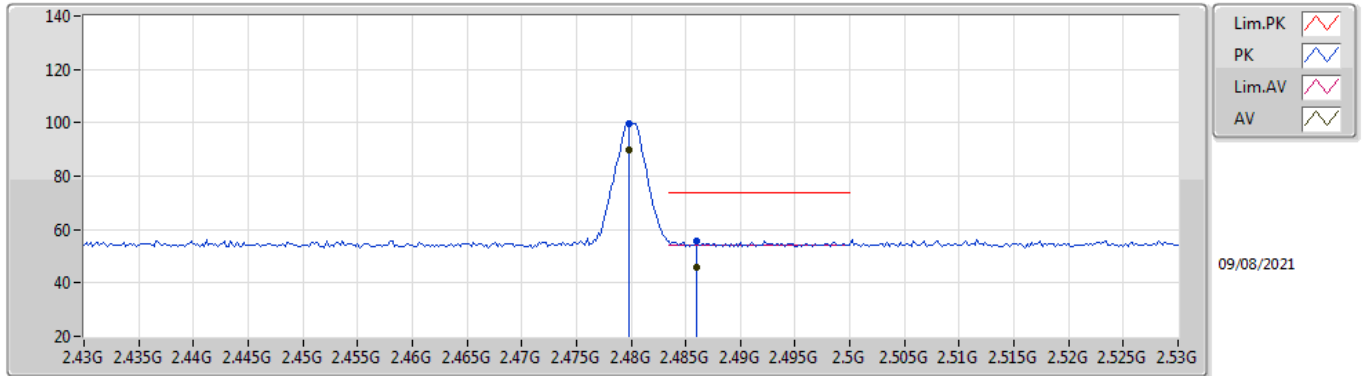
2480MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.4802G	82.70	Inf	-Inf	31.52	3	Vertical	91	2.97	-	51.18	27.50	4.02	-
AV	2.4872G	45.61	54.00	-8.39	31.53	3	Vertical	91	2.97	-	14.08	27.50	4.03	-
PK	2.4802G	92.73	Inf	-Inf	31.52	3	Vertical	91	2.97	-	61.21	27.50	4.02	-
PK	2.4872G	55.64	74.00	-18.36	31.53	3	Vertical	91	2.97	-	24.11	27.50	4.03	-

BT-LE(1Mbps)

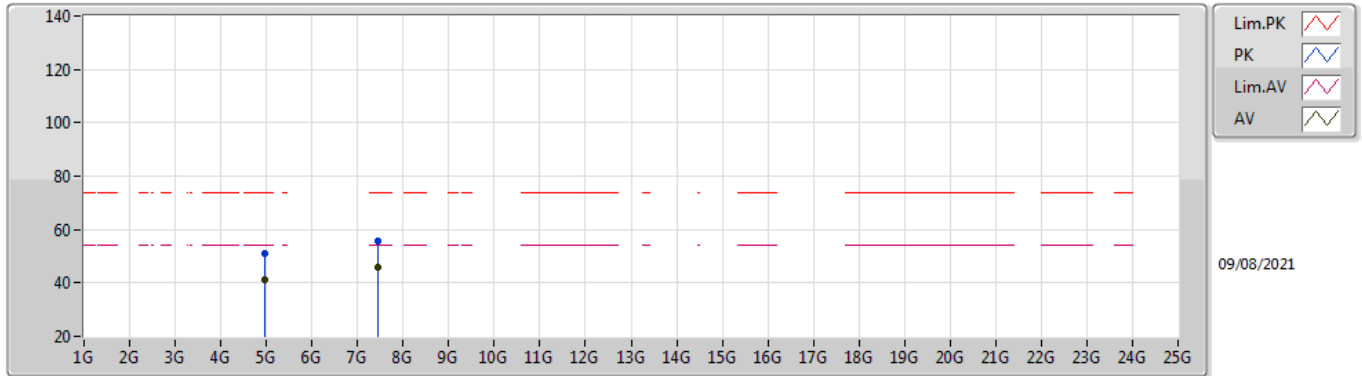
2480MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.4798G	89.78	Inf	-Inf	31.52	3	Horizontal	60	1.00	-	58.26	27.50	4.02	-
AV	2.486G	45.72	54.00	-8.28	31.53	3	Horizontal	60	1.00	-	14.19	27.50	4.03	-
PK	2.4798G	99.81	Inf	-Inf	31.52	3	Horizontal	60	1.00	-	68.29	27.50	4.02	-
PK	2.486G	55.75	74.00	-18.25	31.53	3	Horizontal	60	1.00	-	24.22	27.50	4.03	-

BT-LE(1Mbps)

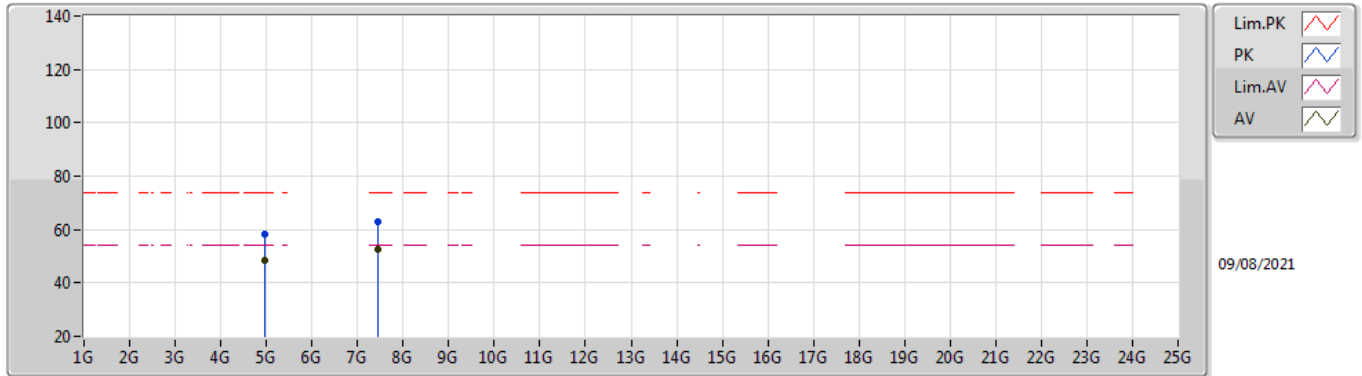
2480MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.96055G	41.09	54.00	-12.91	1.95	3	Vertical	99	2.73	-	39.14	31.34	5.38	34.77
AV	7.43921G	45.87	54.00	-8.13	8.26	3	Vertical	183	2.90	-	37.61	36.28	6.82	34.84
PK	4.96055G	51.12	74.00	-22.88	1.95	3	Vertical	99	2.73	-	49.17	31.34	5.38	34.77
PK	7.43921G	55.90	74.00	-18.10	8.26	3	Vertical	183	2.90	-	47.64	36.28	6.82	34.84

BT-LE(1Mbps)

2480MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.96053G	48.20	54.00	-5.80	1.95	3	Horizontal	126	1.00	-	46.25	31.34	5.38	34.77
AV	7.43928G	52.80	54.00	-1.20	8.26	3	Horizontal	233	1.00	-	44.54	36.28	6.82	34.84
PK	4.96053G	58.23	74.00	-15.77	1.95	3	Horizontal	126	1.00	-	56.28	31.34	5.38	34.77
PK	7.43928G	62.83	74.00	-11.17	8.26	3	Horizontal	233	1.00	-	54.57	36.28	6.82	34.84